

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Amendment of Part 15 of the Commission's)	ET Docket No. 14-165
Rules for Unlicensed Operations in the)	
Television Bands, Repurposed 600 MHz)	
Band, 600 MHz Guard Bands and Duplex)	
Gap, and Channel 37, and)	
)	
Amendment of Part 74 of the Commission's)	
Rules for Low Power Auxiliary Stations in the)	
Repurposed 600 MHz Band and 600 MHz)	
Duplex Gap)	
)	
Expanding the Economic and Innovation)	GN Docket 12-268
Opportunities of Spectrum Through Incentive)	
Auctions)	
)	
Promoting Spectrum Access for Wireless)	GN Docket No. 14-166
Microphone Operations)	

To: Federal Communications Commission
(Filed electronically through ECFS)

REPLY COMMENTS OF CP COMMUNICATIONS, LLC

1. CP Communications, LLC ("CP Communications" or "Company"), submits these Reply Comments in the above-captioned proceedings,¹ to stress that the lack of a firm plan for

¹ See *In the Matter of Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and Amendment of Part 74 of the Commission's Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap, et. al.*, ET Docket No. 14-165, GN Docket No. 12-268, Notice of Proposed Rulemaking, FCC 14-144 (rel. Sept. 30, 2014) ("*White Spaces NPRM*") 79 Fed. Reg. 69,710 (Nov. 21, 2014); *In the Matter of Promoting Spectrum Access for Wireless Microphone Operations, et. al.*, GN Docket Nos. 12-268, 14-16, Notice of Proposed Rulemaking, FCC 14-145 (rel. Sept. 30, 2014) ("*Wireless Microphone NPRM*") (Collectively, the "*NPRMs*"; 79 Fed. Reg. 69,387 (Nov. 21, 2014). Currently, comments

providing continuing access to adequate spectrum for high quality professional wireless microphones is heading the Commission down a path that will have serious undesirable consequences for broad segments of the public, which have come to expect theatrical and music performers and sports participants to be mobile and wireless and clearly audible.

2. CP Communications is a leading source for the rental of wireless production equipment -- including wireless microphones, wireless in-ear monitors, wireless intercom and wireless cueing -- to the broadcast, theatrical, live event, film, corporate, entertainment and other industries. CP Communications also sets up, manages, and supervises the operation of wireless equipment for its customers. CP Communications owns and operates wireless microphones in the 500 and 600 MHz bands and holds licenses for wireless microphones under Part 74 of the FCC's Rules. The Company's business is highly specialized, requiring hardware and skills that lead most high-level professional users to contract with outside vendors. Only a handful of companies offer these services, but their services are critical to the activities of their customers.

3. There are a number of comments which recognize the importance of wireless microphones and are concerned with the possibility of fewer channels being available for wireless microphones.² Indeed, the Commission itself acknowledged the importance of available spectrum for wireless microphone use in the *Second Memorandum Opinion and Order* in the White Spaces

related to the NPRMs are due on February 4, 2015, and reply comments are due on February 25, 2015.

² See generally as examples of the concern Comments of Broadcast Sports, Incorporated, GN Docket 14-166, GN Docket 12-268 (February 4, 2015), Comments of the National Association of Broadcasters, ET Docket 14-165, GN Docket 12-268 (February 4, 2015), Comments of the Society of Broadcast Engineers, Incorporated, GN Docket 14-166, GN Docket 12-268 (February 4, 2015), Comments of Lectrosonics, Inc., GN Docket 14-166, GN Docket 12-268 (February 4, 2015), Comments of Shure Incorporated, GN Docket 14-166, GN Docket 12-269, GN Docket 14-165 (February 4, 2015), Comments of Sennheiser Electronic Corporation, GN Docket 14-166, GN Docket 12-268, GN Docket 14-165 (February 4, 2015) as examples.

Docket.³ The Commission provided protection at that time by reserving two UHF TV channels for them. However, this protection was short-lived as the current proceedings now seek to further limit the spectrum available for the important uses of wireless microphones.

4. Broadcast Sports, Incorporated and Lectrosonics, Inc. explain how many wireless microphones are in service and the spectrum needs for large numbers of events.⁴ The Screen Actors Guild – American Federation of Television & Radio Artists (“SAG-AFTRA”) describes the uses the wireless microphones in all types of activities related to programming including not only cue and control devices but also allowing performers and crew members to safely navigate complicated special effects and dark and crowded backstage areas.⁵ A broad spectrum of consumer needs and interests would be severely limited by lack of adequate spectrum. By way of an example, the Academy Awards telecast on February 22, 2015, involved scores of wireless channels for the voices of all the performers, also audio foldback into their earpieces, and wireless intercom for the dozens of stage managers and technicians. The public would have been sorely disappointed if those performers had been tethered to wires and unable to move freely about the stage. The sheer number of commenters filed by performing arts, educational theaters, symphony orchestras, etc., demonstrate the potential adverse impacts of further limiting spectrum availability to wireless microphone use.

³ See *Second Report and Order*, 23 FCC Rcd 18661 at 18674 (2010).

⁴ See Comments of Broadcast Sports, Incorporated at p. 5-6, Comments of Lectrosonics, Inc. at p. 2.

⁵ See Comments of the Screen Actors Guild – American Federation of Television & Radio Artists (SAG-AFTRA), ET Docket 14-165, GN Docket 12-268, GN Docket 14-166 (February 4, 2015) at p. 2.

5. CP Communications stresses how critical these concerns are and supports these commenters and the principle that adequate spectrum must be provided for wireless microphone use. CP Communications continues to maintain that wireless microphones must have access to two separate 6 MHz channels of UHF spectrum in order to preserve the high quality RF performance required by use of these devices.⁶ As pointed out by Lectrosonics, Inc., wireless microphones must deliver audio of the best possible quality.⁷ The spectrum that is proposed to be available in the guard bands and duplex gap will effectively be unusable due to the lower power at which wireless microphones will have to operate when WSDs will be operating at twice the power levels proposed for microphone use.⁸ By allowing WSD use in the two channels adjacent to channel 37, the Commission will effectively deny wireless microphones users access to that spectrum. Also, as Shure Incorporated notes, professional audio wireless microphones have unique performance requirements which necessitate adequate, clean spectrum.⁹

6. Despite the recognized importance of wireless microphones, there are several commenters who argue that wireless microphones should be limited or subject to database registration. Wireless microphones differ from WSDs and wireless microphones should not be regulated the same as WSDs including being required to register with databases. Wireless microphones are not manufactured to access the Internet and to query databases. These commenters supporting such a requirement fail to recognize the unique operational characteristics

⁶ The Society of Broadcast Engineers, Incorporated also maintain this position. *See* Comments of The Society of Broadcast Engineers, Incorporated at p. 9.

⁷ Comments of Lectrosonics, Inc. at p. 5.

⁸ *See* Comments of Audio-Technica U.S., Inc., WT Docket 14-165, GN Docket No. 12-268, GN Docket 14-166 (February 4, 2015) at p. 10.

⁹ *See* Comments of Shure Incorporated at p. ii and p. 25.

of wireless microphones.¹⁰ Requiring unlicensed microphones to connect to the database is impractical and, in many cases, not even possible. The vast majority of wireless microphone use is indoors where GPS signals are almost always non-existent. Wireless microphones, unlike TVWS devices and WSDs do not by their very nature need connectivity to the internet. There is not always internet connectivity where wireless microphones are deployed and wireless microphones cannot tolerate a sudden command to shut down, just as cellular phones cannot.

7. Consumer Electronics Association seems to be concerned with the coexistence of licensed and unlicensed wireless microphones in the 600 MHz band and the possibility of harmful interference.¹¹ Contrary to its concern, there is no evidence that any interference would be caused. Wireless microphones have operated for decades in TV channels adjacent to actively used broadcast channels, sometimes both adjacent channels, with the maximum possible number of wireless microphones in the open channel (6-12 wireless microphones depending on the quality of the wireless microphone system) without any documented interference complaint to over the air consumer TV receivers. In general, over the air consumer TV receivers are at considerable distances from those locations where wireless microphones are deployed. Further, contrary to the hopes and wishes of those clamoring for the 600 MHz band (and previously the 700 MHz band), these UHF frequencies at low power do not propagate well through or around significantly dense obstructions such as walls employing modern day construction.

¹⁰ See Comments of Microsoft Corporation, ET Docket 14-165, GN Docket 12-268 (February 4, 2015) at p. 36, Comments of Mobile Future, ET Docket 14-165, GN Docket 12-268 (February 4, 2015 at p. 37.

¹¹ See Comments of the Consumer Electronic Association, ET Docket 14-165, GN Docket 12-268 (February 4, 2015).

8. Likewise, Motorola Solutions, Inc.'s concern relating to wireless microphones causing interference in channels 14-20 is unfounded.¹² Motorola Solutions, Inc.'s concern and statement that wireless microphones have been difficult to control or police in the past and could threaten public-safety and life-safety communications that take place in channel 14-20 flies in the face of historical experience.¹³ In the twenty-plus years that wireless microphones have operated in channels 14-20 as authorized, there has not been a single documented case of interference to a public safety or PLMR radio determined to have been caused by wireless microphone operations. Motorola Solutions, Inc.'s further statement that low and high-band VHF frequencies are not particularly well suited or appropriate for wireless microphone use is equally unsupported.¹⁴ The high VHF band (TV channel 7-13) are in fact very well suited for other wireless microphone type devices such as wireless intercom, wireless interruptible fold back ("IFB") and even lower tier wireless microphones. Products have already been introduced in this spectrum and are proving to work quite well where the smaller form factors afforded by UHF filter and antenna sizes are not as critical.

9. The further discussion related to wireless microphones technical operations and parameters are also ill-conceived. The WhiteSpace Alliance suggests that new wireless microphones entering the Channel 37 guard bands should be required to have spectral efficiency of at least 4 bits/Hz with a maximum bandwidth of 25 kHz.¹⁵ This type of specification completely

¹² See Comments of Motorola Solutions, Inc., ET Docket 14-165, GN Docket 14-166, GN Docket No. 12-268 (February 4, 2015) at p. 9.

¹³ *Id.*

¹⁴ *Id.*

¹⁵ See Comments of WhiteSpace Alliance, ET Docket 14-165, GN Docket 12-268 (February 4, 2015) at p. 24.

ignores the facts that wireless microphones can tolerate neither the latency and/or the limited audio frequency response this would induce. Operational performance requirements of WSDs and TVWS devices are not at all similar to that of wireless microphones. CTIA – The Wireless Association goes so far as to commission V-COMM to gauge the impact of unlicensed white spaces devices and wireless microphones in the 600 MHz duplex gap and guard bands.¹⁶ Based on the underlying V-COMM reports of wireless microphones' OOB causing interference to LTE subscriber units at close distances, CTIA – The Wireless Association asserts that over reaching protections are required. However, the underlying V-COMM report is flawed which renders CTIA-The Wireless Associations assertions also flawed. LTE subscriber devices have, according to the 3GPP receiver specifications cited by V-COMM, sensitivity specifications in the mid-90's dBm, based on channel bandwidth. If anything, this relatively poor sensitivity means the LTE subscriber device would be less susceptible to interference and requires the downlink carrier to have a greater field strength. Also, wireless microphone deployments for over a decade have included multiple base to user channels of in-ear-monitor ("IEM"), IFB and wireless intercom transmissions, sometimes at power levels above 100 mW, co-located (several feet to several yards) with wireless microphone transmissions (at both the same and lower RF power levels) with as little as 2 MHz separation while achieving very effective performance of all receivers which have more sensitive front ends. There is little reason to believe LTE subscriber units would experience the kind of receiver desensitization in the real world as the V-COMM tests propose. Finally, LTE/cellular/PCS subscribers are more than used to having many physical geographic obstructions

¹⁶ See Comments of CTIA-The Wireless Association, ET Docket 14-165, GN Docket 14-166, GN Docket 12-268 (February 4, 2015).

to the use of their devices and can – and do regularly – easily move a short distance to get a better signal.

10. As discussion of the database requirements for WSDs, the Commission utilizes a re-check model to determine the location where the device operates and if the device is unable to make contact with the database, the device must cease to operate on the following day.¹⁷ xG Technology, Inc. states that there is no reason to choose such a short shutdown period and that devices should be allowed to continue operation for up to 30 days in the event of database failure.¹⁸ xG Technology, Inc. goes on to say that wireless microphone operations would be protected because without connection to the database, TVWS devices would be unable to change frequency.¹⁹ However, WSDs and TVWS devices will move physical location during the time of a database failure so those last channel availability settings become moot, if not dangerous to the protection of those protected devices.

11. In addition to determining replacement spectrum for lost UHF spectrum as well as additional spectrum to meet increased demand for wireless microphone use, a plan should be adopted for the transition to new spectrum without interruption of service. Mobile Future suggests that the Commission should prohibit the manufacture, import, sale, offer for sale, and shipment of wireless microphones that operate in the repurposed 600 MHz band six months after release of the

¹⁷ See *Wireless Microphone NPRM* at para. 188.

¹⁸ See Response of xG Technology, Inc., to Notice of Proposed Rulemaking, ET Docket 14-165, WT Docket 06-150 (February 6, 2015) at p 7-8.

¹⁹ *Id.*

Channel Reassignment PN.²⁰ The question arises though why manufacturers should be prohibited from manufacturing products – for export – that can tune to 600 MHz.

12. Furthermore, commenters suggest that CTIA requests that the FCC expedite the transition of wireless microphones from 600 MHz.²¹ CTIA does not present adequate basis for this position. As previously noted, the wireless microphone industry has already been disproportionately impacted by the loss of available spectrum (in addition to the earlier transition from the 700 MHz band). The transition of the repurposed spectrum is dependent upon the repacking process. Wireless microphone users are being forced out of the 600 MHz band without prior identification of alternative bands in which to operate, and sufficient lead time for manufacturers to develop equipment for these bands. This is a tremendous impediment to the continued use of wireless microphones.

13. CP Communications has provided information regarding the costs it incurred due to the previous transition out of the 700 MHz band and the Performing Arts Wireless Microphone Working Group likewise discusses the substantial financial investments in technical equipment their members have had to make.²² Audio-Technica U.S., Inc. points out that the useful life of wireless microphones can be 10 years or longer.²³ The expenses to replace inventory, when that equipment has many more years of useful life, is a major economic strain for any company, but

²⁰ See Comments of Mobile Future at p. 8.

²¹ See Comments of CTIA-The Wireless Association, at p. 43-44.

²² See Comments of The Performing Arts Wireless Microphone Working Group, ET Docket 14-165, GN Docket 12-268, ET Docket 14-166 (February 4, 2015) at p. 2 where it notes that many of its organizations the earlier migration out of the 700 MHz band resulted in expenditures of \$25,000 to \$1000,000 and that \$17.5 million would be the cost to the performing arts community of it has to again undertake an additional transition.

²³ See Comments of Audio-Technica U.S., Inc., at p. 21.

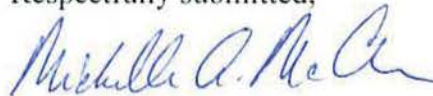
especially for a small business. Equity and fairness dictate that wireless microphone users be compensated for being forced to bear a double hit and again to vacate a band through no fault of their own.²⁴

14. Accordingly, CP Communications supports the commenters that recognize the importance of wireless microphones and the need for rules providing for additional clean spectrum by wireless microphones and disputes those commenters that rely upon false and/or inaccurate information relating to wireless microphones operations. The rules as proposed by the Commission provide more spectrum to unlicensed unproven services in WSDs at the expense of established services providing established and valuable service to the public. Additionally, when adequate spectrum for wireless microphones is found, accommodations should be provided to ameliorate the impact of a second transition by providing for reimbursement of costs that will be incurred to make that transition, particularly in light of the fact that many, if not most, providers of professional wireless microphone services are small businesses which is a factor the Commission is by law required to consider.

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Respectfully submitted,



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²⁴ If users are required to migrate to a new band now, so shortly after replacing their equipment, they will be concerned about whether the Commission will do the same thing to them again in a few more years if TV channels are further truncated.